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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,163	03/30/2001	Konstantine I. Iourcha	PA1744US	8104
22830	7590	02/09/2005	EXAMINER	
CARR & FERRELL LLP 2200 GENG ROAD PALO ALTO, CA 94303			PAPPAS, PETER	
			ART UNIT	PAPER NUMBER
			2671	

DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/823,163

Applicant(s)

IOURCHA ET AL.

Examiner

Peter-Anthony Pappas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-10 and 12-33 is/are rejected.
- 7) ☒ Claim(s) 4 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 4 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
2. In regards to claims 4 and 11 the prior art of record fails to explicitly teach wherein the piecewise analytical function is a piecewise non-linear function.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter: "...wherein each piece of the piecewise analytical function is an analytical function of a predefined class defined by corresponding parameters." See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-3, 8, 10, 17, 24-25 and 28-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Lewis (U.S. Patent No. 6, 285, 348 B1).

6. In regards to claim 1 Lewis teaches a method and system for providing antialiasing of a graphical image, on a display, from data describing at least one object. Said method and system comprise providing a plurality of fragments for the at least one object, wherein a portion of the plurality of fragments intersects a pixel of the plurality of pixels. Each of the plurality of fragments includes a depth value, a slope of the depth value, and a portion of a corresponding pixel that is intersected (column 2, lines 54-67).

Fig. 6A illustrates a pixel in which two polygons and an implicit edge (primitive objects) are desired to be shown. Fig. 6B illustrates said pixel of Fig. 6A in addition to subpixels within said pixel (column 3, lines 38-42). It is noted said objects are considered divided into respective areas designated by said subpixels. It is noted Figs. 6A-6B are considered to represent areas (regions/spans) in x, y space.

Lewis teaches that, for example, where the depth value is z , the slope of the depth value preferably includes horizontal and vertical components, dz/dx and dz/dy , respectively (column 7, lines 37-42). A plurality of subpixel depth values, represented by the function $z = z_1 + ax_1 (dz/dx) + ay_1 (dz/dy)$, for a fragment intersecting a selected pixel are calculated via step 210 (column 7, lines 53-54; column 8, lines 2-3). It is noted said function is considered linear. Once the subpixel depth values are known it is determined whether to store the fragment via comparison amongst the depth values for

respective subpixel fragments (column 4, lines 12-46; column 8, lines 12-46; Figs. 3-4).

It is noted that storing a given depth value for a fragment is considered updating the piecewise analytical function.

It is further noted that the plurality of a fragments, including their respective depth values representation by said previously disclosed function, are considered to represent a piecewise analytical function.

7. In regards to claim 2 the rationale disclosed in the rejection of claim 1 is incorporated herein (column 7, lines 53-54; column 8, lines 2-3). It is noted said function, comprising of parameters, is considered a linear function, wherein linear is considered a predefined class.

8. In regards to claim 3 the rationale disclosed in the rejection of claim 1 is incorporated herein (column 7, lines 53-54; column 8, lines 2-3).

9. In regards to claim 8 the rationale disclosed in the rejection of claim 1 is incorporated herein. It is noted that the Data Processing Unit 122 (column 4, lines 61-67; column 5, lines 1-15; Fig. 2) is considered a first module, Processor Block 124 (column 4, lines 61-67; column 5, lines 1-15; Fig. 2) is considered a second module, Quick Z 126 (column 5, lines 16-26; Fig. 2) is considered a third module and Z Mask Unit 141 (column 8, lines 12-30; Fig. 2) is considered a fourth module.

10. In regards to claim 10 the rationale disclosed in the rejection of claim 3 is incorporated herein.

11. In regards to claim 17 Lewis teaches a CPU 102 (processing device), display 104 and image generating unit 120 (graphics engine), wherein said CPU 102 is coupled to

said image generating unit 120 (Fig. 2). The rationale disclosed in the rejection of claim 1 is incorporated herein. Lewis teaches that the subpixel buffers in the accumulator 142 should hold data relating to the fragments which contribute to the pixel (column 8, lines 33-35).

12. In regards to claim 24 the rationale disclosed in the rejection of claim 1 is incorporated herein.

13. In regards to claim 25 the rationale disclosed in the rejection of claim 1 is incorporated herein.

14. In regards to claim 28 Lewis teaches that a plurality of subpixel depth values for a segment intersecting a selected pixel are calculated (column 7, lines 53-54). Once the subpixel depth values are known it is determined whether to store the fragment. Said determination is based on comparison of subpixel depth values (analytical functions) and the portion of the pixel that the fragment intersects (column 8, lines 12-46).

15. In regards to claim 29 it is inherent that finding an intersection amongst a given group of functions requires the solving of said functions to find said intersect.

16. In regards to claims 30-33 the rationale disclosed in the rejection of claim 1 is incorporated herein (Figs. 6A-6B).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 5-6, 12, 15, 18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis (U.S. Patent No. 6, 285, 348 B1), as applied to claims 1-3, 8, 10, 17, 24-25 and 28-33, in view of Latham (U.S. Patent No. 5, 509, 110).

19. In regards to claim 5 Lewis fails to explicitly teach wherein performing a visibility test is accomplished by using a dynamic search structure to access overlapping areas. Latham teaches utilizes a binary search tree (dynamic search structure) for occlusion testing (column 6, lines 10-50; Fig. 2C).

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teachings of Latham into the system taught by Lewis, which performs occlusions processing (column 8, lines 12-46), because Latham teaches that the utilization of area hierarchy increases the efficiency of the occlusion processing (Abstract; column 2, lines 36-47).

20. In regards to claim 6 Lewis fails to explicitly teach wherein the dynamic search structure is a tree-based structure. The rationale disclosed in the rejection of claim 5 is incorporated herein (column 6, lines 10-50; Fig. 2C).

21. In regards to claim 12 the rationale disclosed in the rejection of claim 5 is incorporated herein. Lewis teaches a CPU 102 (Fig. 2). It is noted said CPU 102 is considered capable of serving as a module for implementing a dynamic search structure for selectively accessing a set of piecewise analytical function parameters.

22. In regards to claim 13 the rationale disclosed in the rejection of claim 6 is incorporated herein.

23. In regards to claim 15 the rationale disclosed in the rejection of claim 1 is incorporated herein. Lewis fails to explicitly teach a span generator configured to generate at least one span for each of the primitive objects, each span corresponding to a horizontal scan line occupied by the primitive object, the span characterized by position data and depth data. Latham teaches each scan is considered as a row of equal sized "blocks," wherein each block is a rectangular portion of the screen and is a given number of pixels wide and a number of scanlines of the scan high. A "span" is a data packet derived from a polygon in the three dimensional image generator database. The "domain" of a span is the contiguous set of blocks of a scan that are covered or touched by the intersection of the scan and the projected screen image of the polygon (column 3, lines 46-64). Lewis teaches a CPU 102 (Fig. 2). It is noted CPU 102 is considered capable of serving as a span generator.

24. In regards to claim 16 Lewis teaches that the subpixel buffers in the accumulator 142 (storage module) should hold data relating to the fragments which contribute to the pixel (column 8, lines 33-35).

25. In regards to claim 18 the rationale disclosed in the rejection of claim 15 is incorporated herein.

26. In regards to claim 20 the rationale disclosed in the rejection of claim 5 is incorporated herein. It is inherent that a binary search tree is a linked list.

27. In regards to claim 21 the rationale disclosed in the rejection of claim 6 is incorporated herein.

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28. In regards to claim 22 the rationale disclosed in the rejection of claim 28 is incorporated herein.

29. Claims 7, 14 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis (U.S. Patent No. 6, 285, 348 B1), as applied to claims 1-3, 8, 10, 17, 24-25 and 28-33.

30. In regards to claim 7 Lewis fails to explicitly teach wherein each piece of the piecewise analytical function is defined on a segment of a scanline. It is well known for a pixel to usually be part of a scan line for a given display (official notice) and thus it would have been obvious to one skilled in the art, at the time of the applicant's invention, for the pixels and subsequent subpixels taught by Lewis to be part of a scan line for a given display, because it is a conventional means for displaying graphic data (i.e. pixels) and would allow for said data to be displayed on any typical graphics display.

31. In regards to claim 14 the rationale disclosed in the rejection of claim 7 is incorporated herein.

32. In regards to claim 23 the rationale disclosed in the rejection of claim 1 is incorporated herein. Lewis fails to explicitly teach a computer readable medium having embodied thereon a program. It is well known to provide a computer program stored on a computer readable medium (official notice) and thus it would have been obvious to one skilled in the art, at the time of the applicant's invention, to provide a program stored on a computer readable medium able to perform the steps of said method,

because by doing so would allow for said steps to be executed on any given computer system and would not limited the execution of said steps to a single computer system.

Response to Arguments

33. Applicant's arguments with respect to claim 1-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Skiena (Tree Structures Lecture 21). Skiena teaches binary trees enable us to search, insert and delete fast, without predefining the size of our data structure. Skiena further teaches that to combine these ideas, we want a "linked list" with two pointers per node. This is the basic idea behind search trees (page 1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 703-305-8984. The examiner can normally be reached on M-F 10:00am-6:30pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 703-305-9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter-Anthony Pappas
Examiner
Art Unit 2671

PAP


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